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### Program Modification

1.40 Biology, M.S.

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BSU Curriculum Forms

Form 1

Curriculum Modification Summary

College: Business, Mathematics and Science

Department: Biology

Proposer: Richard Koch

Proposer’s position: Professor of Biology

Describe the modification(s) you propose, and how it (/they) will work to students' advantage. (This description and explanation will be included in Curriculum Report packets forwarded to the Faculty Senate.):

Revision of the Biology MS program to include a non-thesis, course-work only, online pathway, in addition to the traditional thesis route. We propose that the Biology MS degree have 2 possible pathways for completion: 1) traditional thesis-based study, and 2) online or blended online/on-campus, non-thesis, course work only. We wish to maintain the rigor and research-intensive thesis route for students planning for careers in research, including preparation for doctoral programs. However, we also recognize the need for a more flexible, online, coursework only pathway for teachers seeking lane-changes, professionals wishing to advance their careers and students pursuing non-research-intensive careers.

As part of program revision, we have created 5 new graduate level courses. Each of these courses are designed to improve our already strong graduate curriculum that utilizes data analysis and evaluation to foster creativity and culminate in a capstone project or research thesis defense.

 Modifications proposed (specify number of each):

- Course Modification(s) (form 2)  
- New Course(s) (form 3)  
- Course Drop(s) (form 4)  
- Program Modification(s) (form 5)  
- New Program(s) (form 6)  
- Program Drop(s) (form 7)  

The modifications affect (check):

- Liberal Education  
- Undergraduate Curriculum  
- X Graduate Curriculum  
- Teacher Licensure Program(s)
Form 3
Updated: 9.19.15

New Course Form

Course Number:
   Undergraduate: BIOL 6338

Course Title: Advanced Science Communication

Course Description:
This course is designed to prepare graduate students with practical analytical and communications skills for research and professional environments, whether that’s a research lab, a classroom, a parks system, a fish hatchery, or anything in between. The goal is to help students develop skills that will facilitate achievement of their professional and intellectual goals.

Credits: 3 credits

Prerequisite(s):
   Undergraduate: none
   Graduate: none

1. Reason(s) for creating this course: Core course for the proposed non-thesis/course-work only option for Biology MS

2. How often will this course be offered? Annually Fall term

3. What are the student learning outcomes for the course (please precede each outcome with "Students will…")?
   1. Students will find, organize, analyze, annotate, and cite a variety of primary and secondary sources clearly, concisely, and logically
   2. Students will create compelling written and oral communications with clearly defined goals and appropriately scaled information content and complexity
   3. Students will critique and improve their own and others’ work effectively and generously
   4. Students will use software to increase productivity and efficiency, and improve document style, consistency, readability, and navigation
   5. Students will assess the ways in which the practice of science is both dependent and independent of the society in which it functions, and recognize instances where the scientific enterprise can recapitulate institutional and cultural biases despite (or even because of) an emphasis on objectivity
   6. Students will create clear, parsimonious, and rigorous data visualizations, and critically analyze published data visualizations from a variety of sources
   7. Students will understand different models of scientific thinking and their strengths and limitations, and apply them to propose testable scientific hypotheses to extend existing knowledge

4. What are the major content areas for the course?
   • How is science communicated?
• Reading and writing about research
• Data Visualization
• Posters and Talks
• Professional Communication

5. Is this course repeatable for credit, and if so, what is the maximum number of credits that can be earned? **NO**

6. If this course is intended primarily for off-campus delivery (not offered on campus), what delivery mechanism will be used? **Off-campus, online, D2L**

7. What is the projected maximum class size (cap)? **30**

8. What qualified faculty will be available to teach this course? **Dr. Andrew Arsham**

NOTE WELL: Department and dean, in approving this proposal, attest both to the adequacy of the qualifications of faculty here named, and to their availability to teach the course at the frequency specified above, without excessive overload or disruption to other curriculum.

9. What additional library and other resources need or should be provided for this course, that are not already available? **Improved access to online journals.**

10. What special personal property or service fee(s) would be charged to students taking this course? These charges would be for 1) items that are retained by the student and have an educational or personal value beyond the classroom, or 2) services that are on the student’s behalf (see MnSCU Board Policy 5.11). **None.** Amount per student: $15

For:

11. Attach a sample syllabus for the course. Note: if this course is double-numbered (u-grad/grad), the syllabus must include an additional component for graduate students.
BSU BIOL 6338 Advanced Science Communication

Syllabus Contents

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Course Basics

3 credits, graduate students only
No textbook: all materials available on D2L
https://bemidjistate.learn.minnstate.edu/d2l/home/XXXXX

Andrew M Arsham, Ph.D.
Assistant Professor of Biology
aarsham@bemidjistate.edu
763-488-0426 - BHCC 240

Online Office Hours via Skype:
Tu Th 8-9 and 11-12 -
We 9-11
Tu 12-2 and We 2-4 by appointment
Appointments are highly recommended

You must check your BSU email address at least once a day. All course communications will be sent to your BSU email. I will check my email Monday - Friday and will do my best to respond to time sensitive emails within 24 hours--students should plan to do the same. I expect you to read email from me within a day of my sending it, and I expect a response if one is asked for.

Access ALL your BSU email, calendar, OneDrive, D2L, and e-services, through MyBSU

People learn best when their basic food and housing needs are met and when they are mentally and physically healthy. If you face challenges in any of these areas you are not alone, and I encourage you communicate with me or to seek necessary support:

BSU Student Health and Counseling Services, M-F 9-4, Cedar Hall First Floor, 218-755-2053
http://www.bemidjistate.edu/services/health-counseling/
Description, Learning Goals, and Community

Communications skills and scientific thinking are essential. Professional biologists and biology educators should be able to navigate the biomedical literature, to frame scientific questions, and to communicate the rationale and results of their own and others’ scientific work in classrooms, lab meetings, presentations, publications, and funding applications.

This course is designed to prepare graduate students with practical analytical and communications skills for research and professional environments, whether that’s a research lab, a classroom, a parks system, a fish hatchery, or anything in between. The goal is to help students develop skills that will facilitate achievement of their professional and intellectual goals.

We will also apply scientific thinking and analytical approaches to the responsible conduct of research and to the scientific enterprise itself.

This class will also provide a scaffolding for students to develop their MA/MS capstone or dissertation proposals.

Learning Objectives
By the end of the semester, students should be able to:

1. find, organize, analyze, annotate, and cite a variety of primary and secondary sources clearly, concisely, and logically
2. create compelling written and oral communications with clearly defined goals and appropriately scaled information content and complexity
3. critique and improve their own and others’ work effectively and generously
4. use software to increase productivity and efficiency, and improve document style, consistency, readability, and navigation
5. assess the ways in which the practice of science is both dependent and independent of the society in which it functions, and recognize instances where the scientific enterprise can recapitulate institutional and cultural biases despite (or even because of) an emphasis on objectivity
6. create clear, parsimonious, and rigorous data visualizations, and critically analyze published data visualizations from a variety of sources
7. understand different models of scientific thinking and their strengths and limitations, and apply them to propose testable scientific hypotheses to extend existing knowledge

Learning Community
Every student has the tools to practice scientific thinking—science is a communal endeavor requiring openness, communication, and the willingness to be wrong. Fear of confusion and of error are fundamental impediments to our growth as scientists and to the growth of scientific knowledge itself. In my classes you aren’t expected to know all the answers; you are expected to actively engage with your community in a search for answers. Wrong answers give us all the opportunity to improve our understanding, so share your ideas, embrace your confusion, and we can all get smarter together.

Accessibility and Inclusion
I try to create an accessible environment where everyone has the opportunity to learn and to succeed—please let me know if there are things I can do to make this course more equitable, more accessible, or more compatible with assistive technologies.
• At BSU, Christian Breczinski (Accessibility Services, 202 Decker, 218-755-3883_ _accessibility@bemidjistate.edu) works with students with documented disabling conditions enrolled online or on-campus courses.
• Upon request this document can be made available in alternate formats. Please contact the instructor or Accessibility Services.

Academic Integrity and Student Conduct

Academic and research integrity are non-negotiable. Academic dishonesty will not be tolerated, and students are expected to follow BSU’s Academic Integrity Policies. The most basic rules of thumb are:

• never take credit for work or ideas that are not yours
• always cite your sources, even if it’s an idea you got from one of your classmates over lunch

Plagiarism in written assignments, including online discussion, is a very serious offense and can lead to a failing grade in the assignment or even the course and to notification of department chair and/or dean. Students are encouraged to email me with any questions regarding plagiarism or academic dishonesty.

Bemidji State University Policies

BSU students have access to student services and advising resources. The BSU Student Handbook includes policies governing course withdrawal and tuition, and a student code of conduct, which states that students will:

• work as honest and respectful partners with the University in fulfilling its academic and administrative mission and responsibilities, fulfilling their academic endeavors in an honest and forthright manner.
• speak and listen to others with care, seeking personal understanding and maintaining respect and civility.
• respect and protect the personal privacy, rights, and safety of others with regard to physical and sexual boundaries, living space, possessions, electronic accounts and academic endeavors.

Electronic Communications and Software

• If you do not have consistent access to a computer and a quality internet connection or will be doing fieldwork that interferes with internet access, please let me know me as soon as possible.
  o Also check PCs for People, which sells discounted computers to people with low income.
• Here are email configuration instructions for computer and mobile Outlook configuration.
• All assignments, grades, and feedback are via D2L—if you cannot access D2L, alert me right away.
• Other technical support can be found in the BSU IT Knowledge Base and the Help Desk (218 755-4207 or studenthelp@bemidjistate.edu)
• BSU students can install Microsoft Office 365 on personal computers

Online Journal and Database Access

Some readings may require logging in to the BSU library using your 14-digit ID located under the barcode of your BSU ID—the default password is your last name, all lowercase. Details are covered in a PDF tutorial. If you do not have a BSU ID or cannot access the BSU Library, email the Extended Learning office immediately.
If you are trying to access a paywalled research article, [google](https://www.google.com) is your friend.

If you still can’t access it, email me.

**Under no circumstances should you ever pay to access a scientific research article.**

## Course Structure, Grading, and Late Assignments

The course will be broken down into 5 major content units lasting 2-6 weeks. Each week there will be readings and 1-2 graded assignments on D2L. Over the 16 weeks of the semester there will be 20 graded assignments worth either 2 or 4 points. Total points for the semester are 50, so each assignment counts for only 4% or 8% of the final grade.

This approach means that no single event can have a high-stakes effect on your grade and that those students wishing to earn an A will need to stay on task throughout the semester.

The grading system is very simple and is designed to reward consistent weekly engagement with the material.

There is no curve, everyone in this class can earn an A.

- Each assignment will have specific instructions—if you follow all the instructions you will get a 2/2. This will not necessarily be easy, but it should be clear and predictable.
- **If my instructions are not clear to you there’s a good chance they are also unclear to your classmates—please email me right away and I’ll try to clarify for the entire class.**
- The course will end on the last scheduled day of classes - there will be no exams or assignments during finals week.

### Late policy

Due dates are irrespective of campus closings, holidays, etc. **There will be an assignment due Thanksgiving week.** Late assignments cannot earn a 2.

Assignments submitted less than a week late will be graded but will lose 1 point and will not receive written feedback.

Assignments more than a week late will be graded 0.

If circumstances in your life are preventing you from completing your assignments please get in touch with me and we will work together on a success plan.
### Course Calendar (details on D2L)

**Unit 1: Who Are We, What is Science, and Why and How is it Communicated?**
Weeks 1-3. We will think about the nature of scientific inquiry and the philosophical basis of the scientific method; we will begin to practice skills of finding, understanding, and keeping track of scientific literature; and students will lay the groundwork for individual projects that will become MA/MS capstone or dissertation proposals.

**Unit 2: Reading and Writing About Research**
Weeks 4-8 will increasingly focus on pulling together the strands of students’ individual research questions and on different modes and venues of written communication. Students will practice finding, reading, and summarizing scientific papers and practice writing grants.

**Unit 3: Data Visualization**
Weeks 9-10 will focus on how we analyze and communicate scientific ideas and data visually instead of verbally, and how we use design principles to focus a viewer’s attention on cause (independent variables) and effect (dependent variables).

**Unit 4: Posters and Talks**
Weeks 11-13 will transition from written and data communication to oral presentations.
Unit 5: Professional Communication
Weeks 14-16 we will think about who is included and excluded in the scientific workforce, why it matters, and how to participate in and help build equitable collaborative teams especially as a scientific leader/teacher.
BSU Curriculum Forms

Form 3
Updated: 9.19.15

New Course Form

Course Number: 
  Undergraduate:  
  Graduate: **BIOL 6340**

Course Title: **Controversies in Biology**

Course Description:
In this online graduate course, students will examine the responsible conduct and the social, economic, legal, and environmental impact of research across a wide range of the biological sciences, including the consequences of biological knowledge on humans, other animals, and the planet. Using a combination of readings, case studies, scholarly literature, and popular culture we will focus on practical decision-making frameworks in research, education, natural resources, and policy professions.

Because controversial topics touch on deeply held personal beliefs and excite passionate disagreement, the course will also focus on communication, standards of evidence, and curiosity as tools to find common ground between differing positions. Topics will include genetic counseling and prenatal genetic testing, CRISPR and other gene editing and gene therapy technologies, cloning, biodiversity, hunting and fishing, invasive species, and the impact of climate change on organisms.

Credits: **3 credits**

Prerequisite(s):
  Undergraduate:  
  Graduate: **none**

1. **Reason(s) for creating this course:** Core course for the proposed non-thesis/course-work only option for Biology MS

2. **How often will this course be offered?** Biannually
3. What are the student learning outcomes for the course (please precede each outcome with "Students will...")?

Students will identify categories and analyze examples of misconduct in biomedical, wildlife, and aquatics research
Students will apply consensus principles in the responsible conduct of research across subdisciplines, including biosafety
Students will find and synthesize primary research literature, lay and secondary sources, policy documents to identify societal and environmental impacts of biological research methods and knowledge production
Students will recognize and communicate the importance, impact, limits, and trade-offs of biological research to non-scientists

4. What are the major content areas for the course? Biology MS

5. Is this course repeatable for credit, and if so, what is the maximum number of credits that can be earned? NO

6. If this course is intended primarily for off-campus delivery (not offered on campus), what delivery mechanism will be used? Off-campus, online, D2L, possible synchronous online delivery

7. What is the projected maximum class size (cap)? 30

8. What qualified faculty will be available to teach this course? Dr. Andrew Arsham

NOTE WELL: Department and dean, in approving this proposal, attest both to the adequacy of the qualifications of faculty here named, and to their availability to teach the course at the frequency specified above, without excessive overload or disruption to other curriculum.

9. What additional library and other resources need or should be provided for this course, that are not already available? none

10. What special personal property or service fee(s) would be charged to students taking this course? These charges would be for 1) items that are retained by the student and have an educational or personal value beyond the classroom, or 2) services that are on the student’s behalf (see MnSCU Board Policy 5.11).

Amount per student: $15

For:

11. Attach a sample syllabus for the course. Note: if this course is double-numbered (u-grad/grad), the syllabus must include an additional component for graduate students.
BSU BIOL 6340 Controversies in Biology Syllabus

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Course Basics

3 credits, grad students only. No textbook: all materials available on D2L:
https://bemidjistate.learn.minnstate.edu/d2l/home/XXXX

Andrew M Arsham, Ph.D.
Assistant Professor of Biology
aarsham@bemidjistate.edu
763-488-0426 -BHCC 240

Online Office Hours:
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Appointments are highly recommended!

You must check your BSU email address at least once a day. All course communications
will be sent to your BSU email. I will check my email Monday - Friday and will do my best to
respond to time sensitive emails within 24 hours—students should plan to do the same. I
expect you to read email from me within a day of my sending it, and I expect a response if one
is asked for.

Access ALL your BSU email, calendar,
OneDrive, D2L, and e-services, through MyBSU

People learn best when their basic food and housing needs are met and when they are mentally
and physically healthy. If you face challenges in any of these areas you are not alone, and I
encourage you communicate with me or to seek necessary support:

BSU Student Health and Counseling Services, M-F 9-4, Cedar Hall First Floor, 218-755-2053
http://www.bemidjistate.edu/services/health-counseling/
Description, Learning Goals, Community, and Inclusion

Description
In this online graduate course, students will examine the responsible conduct and the social, economic, legal, and environmental impact of research across a wide range of the biological sciences, including the consequences of biological knowledge on humans, other animals, and the planet.

Using a combination of readings, case studies, scholarly literature, and popular culture we will focus on practical decision-making frameworks in research, education, natural resources, and policy professions.

Because controversial topics touch on deeply held personal beliefs and excite passionate disagreement, the course will also focus on communication, standards of evidence, and curiosity as tools to find common ground between differing positions. Topics will include genetic counseling and prenatal genetic testing, CRISPR and other gene editing and gene therapy technologies, cloning, biodiversity, hunting and fishing, invasive species, and the impact of climate change on organisms.

Learning Objectives
Upon completion of this course, students should be able to:
identify categories and analyze examples of misconduct in biomedical, wildlife, and aquatics research
apply consensus principles in the responsible conduct of research across subdisciplines, including biosafety
find and synthesize primary research literature, lay and secondary sources, policy documents to identify societal and environmental impacts of biological research methods and knowledge production
recognize and communicate the importance, impact, limits, and trade-offs of biological research to non-scientists

Learning Community
Every student has the tools to practice scientific and ethical thinking—intellectual inquiry is a communal endeavor that requires openness, communication, and the willingness to be wrong. Fear of confusion and fear of being wrong are fundamental impediments to our growth as thinkers and to our exploration of ethical systems. In my classes you aren’t expected to know all the answers; you are expected to actively engage with your community in a search for answers. Share your ideas, embrace your confusion, and we can all get smarter together.

Accessibility and Inclusion
I try to create an accessible environment where everyone has the opportunity to learn and to succeed—please let me know if there are things I can do to make this course more equitable, more accessible, or more compatible with assistive technologies.

At BSU, Christian Breczinski (Accessibility Services, 202 Decker, 218-755-3883 accessibility@bemidjistate.edu) works with students with documented disabling conditions enrolled online or on-campus courses.

Academic Integrity and Student Conduct
Academic and research integrity are non-negotiable. Academic dishonesty will not be tolerated, and students are expected to follow BSU’s Academic Integrity Policies. The most basic rules of thumb are:

- never take credit for work or ideas that are not yours
- always cite your sources, even if it’s an idea you got from one of your classmates over lunch
Plagiarism in written assignments, including online discussion, is a very serious offense and can lead to a failing grade in the assignment or even the course and to notification of department chair and/or dean. Students are encouraged to email me with any questions regarding plagiarism or academic dishonesty.

Bemidji State University Policies
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- work as honest and respectful partners with the University in fulfilling its academic and administrative mission and responsibilities, fulfilling their academic endeavors in an honest and forthright manner.
- speak and listen to others with care, seeking personal understanding and maintaining respect and civility.
- respect and protect the personal privacy, rights, and safety of others with regard to physical and sexual boundaries, living space, possessions, electronic accounts and academic endeavors.

Electronic Communications and Software

- If you do not have consistent access to a computer and a quality internet connection or if you are embarking on field work that impedes your access please let me know me as soon as possible.
  - Also check PCs for People, which sells discounted computers to people with low income.
- Here are email configuration instructions for computer and mobile Outlook configuration.
- All assignments, grades, and feedback are via D2L—if you cannot access D2L, alert me right away.
- Other technical support can be found in the BSU IT Knowledge Base and the Help Desk (218 755-4207 or studenthelp@bemidjistate.edu)
- BSU students can install Microsoft Office 365 on personal computers

Online Journal and Database Access
Some readings may require logging in to the BSU library using your 14-digit ID located under the barcode of your BSU ID—the default password is your last name, all lowercase. Details are covered in a PDF tutorial. If you do not have a BSU ID or cannot access the BSU Library, email the Extended Learning office immediately.

If you are trying to access a paywalled research article, google is your friend.

If you still can’t access it, email me.

Under no circumstances should you ever pay to access a scientific research article.

Assignments, Grading, and Lateness
The course has 4 content units of 3-5 weeks. Except for the first and last weeks of the semester and Thanksgiving, units will have weeks with a collection of readings due Tuesdays and a written response due Thursdays. Due dates are irrespective of campus closings, holidays, etc. There will be an assignment due Thanksgiving week.

The last week of each unit will not have readings but are wrap-up assignments which may be a larger writing, or group discussion, or something else to be determined.

The grading system is simple and rewards consistent weekly engagement. There is no curve, everyone in this class can earn an A.

- Every week there will be an assignment which will be graded on a 3 point scale (see below). This includes the weeks
that we will be working on final projects.

- Each assignment will have specific instructions—if you follow all the instructions you will get a 3. This will not necessarily be easy, but it should be clear and predictable.
- If my instructions are not clear to you there’s a good chance they are also unclear to your classmates—please email me right away and I’ll try to clarify for the entire class.
- Final grades reflect the percentage of total points earned (each assignment is worth 1/16 (~6%) of your final grade.

**Individual Assignment Grading Rubric**

3: Meets all expectations: Completed assignment follows instructions and demonstrates engagement with and comprehension of the material; factual claims are specific and backed by evidence; all sources (including course readings and class discussion) are clearly cited.

2: Meets some expectations: Completed assignment demonstrates engagement with and comprehension of the material but doesn’t follow all instructions or include required elements; to earn a 2, factual claims must still be specific and backed by evidence, and all sources must be clearly cited.

1: Below expectations: Does not meet assignment requirements and/or due dates; shows insufficient evidence of content completion, comprehension, or effort; does not follow the instructions; does not cite sources. If any writing piece contains an unsubstantiated statement that is easily proven false it will earn an automatic 1.

0: Ignores expectations: Assignment was not turned in or was late without explanation

**Late policy**

Late assignments cannot earn a 3.

Assignments submitted less than a week late will be graded but will lose 1 point and will not receive written feedback.

Assignments more than a week late will be graded 0.

If circumstances in your life are preventing you from completing your assignments please get in touch with me and we will work together on a success plan.

**Final grade calculation**

100% > A ≥ 85% > B ≥ 70 > C ≥ 50% > D ≥ 33%> F

In short, students earning all 2s (66%) will have a final grade of C, students earning all 2s and at least 2 3’s (71%) will earn a B and students with more 3s than 2s (85%, or an average of 2.55) will earn an A.
Unit 1: Integrity and impact in biological research

Weeks 1-5 will include basic introductions to one another and an overview of the responsible conduct of research and different types of research negligence, malfeasance, and moral turpitude. We will think about how science is funded, about the role of society in establishing scientific priorities, and about the scientist’s place in and responsibility to the societies in which they work, including a responsibility not to incur environmental or public health damages through lapses in safety. We will also read about and discuss harassment and discrimination in institutions, laboratories, and field sites and whether these can broadly be categorized as research misconduct. What are scientists’ responsibilities to the wide range of plants and animals they study in the lab and in the field, and how is the value of the research measured and weighed against potential harms? Do those responsibilities differ when studying vertebrates vs invertebrates? Social vs asocial insects? Animals with a central nervous system vs those without? Can harm to “higher” organisms be justified by the potential for human benefit?

Unit 2. Indoor Biology: genomic and gene editing technologies

Weeks 6-9 will start with an overview of the history and current state of the art of genome editing technologies, followed by an investigation of the most promising or practical emerging technique, and an exploration of specific applications such as stem cell therapies, anti-cancer immunotherapies, and gene therapies for simple and complex disorders. We’ll discuss the efficacy and accuracy of these techniques, and also their specific limitations and side effects that can often get buried beneath the hype. How is the economic value of these often astronomically expensive potential therapies balanced with maintaining patient access? Students will be asked to speculate on topics such as: could in vitro cultured brain cells, in sufficient quantity, attain sentience? Can polygenic scores be used to improve human health or are they simply the return of eugenics (or both)? Can genetic engineering be used to eradicate mosquitoes and the diseases they transmit? How can scientists measure the benefits of such interventions against the potential harm to animal welfare and ecological balance? Are species only valuable for the (actual or potential) economic or ecological services they provide, or does biodiversity have a non-instrumental value?

Unit 3. Outdoor Biology: Environmental stewardship

In weeks 10-13 we take it outside, discussing the importance of research on and in the environment and how to view the benefits of that research while considering the impact of the researchers on the researched. How do we define biodiversity in terms of organisms, genomes, ecosystems, or something else? Is biodiversity intrinsically valuable, or is its primary value in the potential for economic or ecological services? If biodiversity creates high-value commercial products (for instance through bioprospecting for antibiotics or therapeutic phages) who owns the intellectual property? How do the impacts and outputs of engineered food production techniques like agriculture and aquaculture compare to hunting and foraging? Given that scientific advances directly caused global climate change, water shortages, and mass extinction, can (and should) we science our way out of these problems? Or is more science not the answer?

Unit 4: Final projects

In weeks 14-16 students will choose a course topic and create an independent research project related to their intended career. Wherever possible students will also be encouraged to choose a topic related to or in support of their capstone or dissertation work in the Biology Master’s program. Final projects can
be (but are not limited to!) written, oral, visual, artistic, musical, theatrical, acrobatic, or aquatic. The goal is to explore an idea in depth, synthesize material from variety of sources, and communicate those findings to scientists and non-scientists.
BSU Curriculum Forms

Form 3
Updated: 9.19.15

New Course Form

Course Number:
  Undergraduate: N/A
  Graduate: 6330

Course Title: Current Topics in Biology

Course Description: A critical analysis of scientific information distributed in social, popular, and traditional media.

Credits: 3

Prerequisite(s):
  Undergraduate: N/A
  Graduate: None

1. Reason(s) for creating this course: This course will be a requirement for the current Biology Master’s program.

2. How often will this course be offered? Annually Fall

3. What are the student learning outcomes for the course (please precede each outcome with "Students will...")?
   - Students will discover current, relevant information on current topics in Biology.
   - Students will evaluate topics for discussion and presentation.
   - Students will defend these topics and argue for their validity.
   - Students will analyze articles and differentiate between scientifically sound information and propaganda.
   - Students will relate social, economic, ethical, and historical perspectives to drivers of current biological research.
   - Students will create a ‘newsworthy’ story suitable for publication on social media

4. What are the major content areas for the course?
   The major content and ‘theme’ of this class is the critical analysis of scientific (primarily biological) information found in current literature, video, and social media. The intent of this course is to gain experience in the ability to discern legitimate scientific evidence from propaganda.

5. Is this course repeatable for credit, and if so, what is the maximum number of credits that can be earned? No
6. If this course is intended primarily for off-campus delivery (not offered on campus), what delivery mechanism will be used? **Video lectures, PowerPoint lectures, discussions, discussion groups, and video student presentations will be delivered via Panopto and D2L.**

7. What is the projected maximum class size (cap)? **25**

8. What qualified faculty will be available to teach this course? **Debbie Guelda, Andy Arsham, Richard Koch**

   NOTE WELL: Department and dean, in approving this proposal, attest both to the adequacy of the qualifications of faculty here named, and to their availability to teach the course at the frequency specified above, without excessive overload or disruption to other curriculum.

9. What additional library and other resources need or should be provided for this course, that are not already available? **None**

10. What special personal property or service fee(s) would be charged to students taking this course? These charges would be for 1) items that are retained by the student and have an educational or personal value beyond the classroom, or 2) services that are on the student’s behalf (see MnSCU Board Policy 5.11).
   Amount per student: **$15**
   For:

11. Attach a sample syllabus for the course. Note: if this course is double-numbered (u-grad/grad), the syllabus must include an additional component for graduate students.
Current Topics in Biology 6330 – 3 credits  
Fall 2021 - Dr. D. Guelda  
Office – 218g Sattgast  E-mail dguelda@bemidjistate.edu


Course overview
Current Topics in Biology will allow direct application of science to everyday life as reported in the popular media. We will focus our analysis on several major topics and case studies that are currently being covered in the media. These discussions will explore not only the underlying biology and technology associated with the topic, but will also consider the political, legal, economic, ethical, and social implications of the issue. In the process students will become more critical consumers of scientific information by learning to evaluate the potential for, and causes of, bias in press reports about biology.

Course objectives
- Students will discover current, relevant information on current topics in Biology.
- Students will evaluate topics for discussion and presentation.
- Students will defend these topics and argue for their validity.
- Students will analyze articles and differentiate between scientifically sound information and propaganda.
- Students will relate social, economic, ethical, and historical perspectives to drivers of current biological research.
- Students will create a ‘newsworthy’ story suitable for publication on social media

Attendance policy:
If you are not active in the course and its associated discussion and presentation, you miss important information. You are responsible for learning material covered in class. I will not provide additional if a class is missed; you are responsible from obtaining missed content from a classmate.

Academic Integrity:
BSU students are expected to practice the highest standards of ethics, honesty and integrity in all of their academic work. Any form of academic dishonesty (e.g., plagiarism, cheating and misrepresentation) may result in disciplinary action. Possible disciplinary actions may include failure for part or an entire course as well as suspension from the University. It is suggested that you review BSU’s statement on academic integrity found within the Student Code of Conduct.

Expectations of Students for In-Class and Time Class Preparation

In-class time
For each lecture credit university policy states that students will spend 1 hour per week in class.

Outside of class time
For each lecture credit university policy states that students will spend 2 hours per week outside of class for 15 weeks.

Thus, your expected total time commitment for this 9 credit class is 9 hours per week.
Communication:
I am to be referred to by my professional name, Dr. Guelda.

Email:
It is important that you begin to think of yourself as a professional and conduct yourself as such. This is important in all aspects of communication but especially email as this mode is used frequently. It is important to realize that communication to a professor/supervisor/employer is required to be more formal than a text or email to a friend. Please refer to these guidelines:

- Treat email with all university faculty and staff as a business correspondence.
- Use your BSU email account. I will occasionally email the class and only use this address (FYI - BSU email is secure, most personal email accounts are not).
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Semester Schedule
The amount of material covered in each lecture is dependent upon the level of comprehension by the students, the amount of discussion generated and the difficulty of the subject matter as well as new topics being added to Current Topics in Biology. Because of this, the schedule below is tentative. Adjustments in required reading, discover, and due dates will be made as necessary. Additional reading assignments may be required and will be provided by the instructor.

<table>
<thead>
<tr>
<th>Week</th>
<th>Subject/Activity</th>
<th>Assigned Reading</th>
<th>Assignments</th>
</tr>
</thead>
</table>
| 1    | Introduction and course overview  
Creation of learning communities | None | None |
| 2    | What questions are being posed currently in biology? How do current questions we see in the news relate to the big questions of biology as a science? | Chapter 1: Discovery and Causation | Assignment: Top 10 Discover Stories |
| 3    | Debrief on Top 10 | Chapter 2: | Due: Top 10 Discover |

BSU Biology MS Master’s Program – curriculum proposal for revision Fall 2019: Page 23 of 46
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Description</th>
<th>Observations as Evidence</th>
<th>Stories</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Many are answering questions. How do we know if they are doing a good job?</td>
<td><strong>Chapter 3:</strong> From Observations to Data</td>
<td><strong>Discovery:</strong> Top (and Bottom!) 10 stories</td>
</tr>
<tr>
<td>5</td>
<td>What about social media? What is true and what is hype? Can you trust the ‘reliable’ sites?</td>
<td><strong>Chapter 4:</strong> The Gold Standard for Research</td>
<td><strong>Discovery:</strong> a current topic that appeals to YOU <strong>Due:</strong> Assessment of social media stories</td>
</tr>
<tr>
<td>6</td>
<td>Your Interest and applicability. Why is this relevant? Timely? Important?</td>
<td><strong>Chapter 5:</strong> Correlations, Comparisons, and Causation</td>
<td><strong>Discovery:</strong> Discussion about quality control</td>
</tr>
<tr>
<td>7</td>
<td>Open Educational Resources: Who is manning the ship?</td>
<td><strong>Chapter 6:</strong> The Diverse Use of Models in Biology</td>
<td><strong>Discovery:</strong> Locating the good, bad, and the ugly <strong>Due:</strong> Information on OER quality control</td>
</tr>
<tr>
<td>8</td>
<td>Science websites: Finding the substance among the distractions</td>
<td><strong>Chapter 7:</strong> Genes, Environments, and the Complexity of Causation</td>
<td><strong>Discovery:</strong> A current topic from this month’s popular literature <strong>Due:</strong> Argument of Your Interest piece</td>
</tr>
<tr>
<td>9</td>
<td>Traditional peer review: How to read and evaluate critically.</td>
<td><strong>Chapter 8:</strong> From Causes to Consequences: Considering the Weight of Evidence</td>
<td><strong>Discovery:</strong> A recent peer-reviewed journal article</td>
</tr>
<tr>
<td>10</td>
<td>Peer review to mainstream: Barriers, limitations, and frustrations. If not accessible, is it valuable?</td>
<td><strong>Chapter 9:</strong> Science as a Social Process</td>
<td><strong>Due:</strong> Critique of Your Interest piece</td>
</tr>
<tr>
<td>11</td>
<td>Learning Community formation: Sharing topic similarities – a consensus on a topic?</td>
<td><strong>To be determined:</strong> (provided by Learning Communities)</td>
<td><strong>Discovery:</strong> Group decision on general topic and final paper to assess.</td>
</tr>
<tr>
<td>12</td>
<td>Learning Community formation: Sharing topic differences – conveying kudos and concerns to others of a different discipline</td>
<td><strong>To be determined:</strong> (provided by Learning Communities)</td>
<td><strong>Due:</strong> Explanation of topic and sharing assessment to the group. <strong>Due:</strong> Critique of group paper</td>
</tr>
<tr>
<td>13</td>
<td>Documentaries: Truth? Creative filmmaking? Satire?</td>
<td><strong>Provided:</strong> Keep a Close Watch: Analyzing a Documentary’s Strengths and Weaknesses by Sheila Curran Bernard</td>
<td><strong>Discovery:</strong> Location of good, bad, and questionable documentaries. <strong>Due:</strong> Critique of group paper</td>
</tr>
<tr>
<td>14</td>
<td>Mini-media: Everyone’s a YouTube star-Critical viewing</td>
<td><strong>To be provided:</strong></td>
<td><strong>Discovery:</strong> Location of high and low quality videos <strong>Due:</strong> Assessment of</td>
</tr>
<tr>
<td>15</td>
<td>Course summary, evaluation</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>---------------------------</td>
<td>------</td>
<td></td>
</tr>
</tbody>
</table>

**Discovery:**
Final discussion about critical thinking of current topics in Biology

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**Grading**

<table>
<thead>
<tr>
<th>Assignments</th>
<th>8 @ 25 = 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion participation</td>
<td>15 @ 20 = 300</td>
</tr>
<tr>
<td>Discovery</td>
<td>9 @ 20 = 180</td>
</tr>
</tbody>
</table>

Total possible points 680

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**All students will receive 15 hours of tutoring at no cost.** Tutoring services cover a variety of subject areas including math, writing, accounting, economics, biology, languages and nursing. Additional time may be purchased by students directly through tutor.com.

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Students may experience mental health concerns or stressful events that may lead to diminished academic performance. The Student Center for Health & Counseling is available to assist you with concerns and can include stress relief services. They can be reached in Cedar Hall, First Floor. Phone: (218) 755-2053. And of course, if I can ever be of assistance, please don’t hesitate to let me know; I am here to help YOU!

**Office Visits and Professor Accessibility:**
I am happy to be of assistance whenever possible! Office hours are on my door for those of you that can come to campus. If at any time you are having trouble with this course, please let me know! If you want to discuss something at length, I’ll be happy to schedule an in-person or phone meeting. This is my 19th year at BSU and my 24th year teaching. I absolutely love teaching, students, and seeing success and learning through hard work and commitment. It is an honor to be your professor.

**Upon request this document can be made available in alternate formats.**
Please contact Accessibility Services (755-3883)
BSU Curriculum Forms

Form 3
Updated: 9.19.15

New Course Form

Course Number: 6450
  Undergraduate: N/A
  Graduate: 

Course Title: **Trajectories in Biology: Past, Present, and Future**

Course Description: **Trajectories in Biology** is an expansive, wholistic view of how the history of biology laid the groundwork to the explosion of knowledge in the 19th and 20th century. As we grapple with technological, ethical, and biological possibilities we will imagine and explore how the vast field of biology might evolve in, and beyond, our lifetimes.

Credits: 3

Prerequisite(s):
  Undergraduate: N/A
  Graduate: **None**

1. Reason(s) for creating this course: **This course will be a requirement for the current Biology Master’s program.**

2. How often will this course be offered? **Annually Spring**

3. What are the student learning outcomes for the course (please precede each outcome with "Students will...")?

- Students will **discover** important historical events in biology
- Students will be able to **correlate** historical perspectives with drivers of current and future biological applications.
- Students will **critique** relevant topics and opinion pieces addressing future trends in synthetic biology and bioengineering.
- Students will **determine** potential implications of trends located.
- Students will **assemble** and **appraise** ideas and communicate opinions of these.
- Students will **imagine** future developments in biology

4. What are the major content areas for the course? **The major content of this class is the understanding of historical events that have shaped biological understanding. This framework will allow students, facilitated by the instructor, to discuss implications of how this field may change given current (and future) technologies. Special consideration will be given to ethical issues raised as the field of biology moves forward.**
5. Is this course repeatable for credit, and if so, what is the maximum number of credits that can be earned? No

6. If this course is intended primarily for off-campus delivery (not offered on campus), what delivery mechanism will be used? Video lectures, PowerPoint lectures, discussions, discussion groups, and video student presentations will be delivered via Panopto and D2L.

7. What is the projected maximum class size (cap)? 25

8. What qualified faculty will be available to teach this course? Debbie Guelda, Andy Arsham, Richard Koch

NOTE WELL: Department and dean, in approving this proposal, attest both to the adequacy of the qualifications of faculty here named, and to their availability to teach the course at the frequency specified above, without excessive overload or disruption to other curriculum.

9. What additional library and other resources need or should be provided for this course, that are not already available? None

10. What special personal property or service fee(s) would be charged to students taking this course? These charges would be for 1) items that are retained by the student and have an educational or personal value beyond the classroom, or 2) services that are on the student’s behalf (see MnSCU Board Policy 5.11).
    Amount per student: $ 15
    For:

11. Attach a sample syllabus for the course. Note: if this course is double-numbered (u-grad/grad), the syllabus must include an additional component for graduate students.
Texts:


Course overview
Trajectories in Biology is an expansive, wholistic view of how the history of biology laid the groundwork to the explosion of knowledge in the 19th and 20th century. As we grapple with technological, ethical, and biological possibilities we will imagine and explore how the vast field of biology might evolve in, and beyond, our lifetimes.

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- Students will determine potential implications of trends located.
- Students will assemble and appraise ideas and communicate opinions of these.
- Students will imagine future developments in biology

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In-class time
For each lecture credit university policy states that students will spend 1 hour per week in class. Outside of class time, For each lecture credit university policy states that students will spend 2 hours per week outside of class for 15 weeks.

Thus, your expected total time commitment for this 3 credit class is 9 hours per week.

**Communication:**
I am to be referred to by my professional name, Dr. Guelda.

**Email:**
It is important that you begin to think of yourself as a professional and conduct yourself as such. This is important in all aspects of communication but especially email as this mode is used frequently. It is important to realize that communication to a professor/supervisor/employer is required to be more formal than a text or email to a friend. Please refer to these guidelines:

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**Semester Schedule**
The amount of material covered in each lecture is dependent upon the level of comprehension by the students, the amount of discussion generated and the difficulty of the subject matter as well as new topics being added to Current Topics in Biology. Because of this, the schedule below is tentative. Adjustments in required reading, discover, and due dates will be made as necessary. Additional reading assignments may be required and will be provided by the instructor.

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</tr>
</thead>
</table>

BSU Biology MS Master’s Program – curriculum proposal for revision Fall 2019: Page 30 of 46
<table>
<thead>
<tr>
<th></th>
<th>Introduction and course overview</th>
<th>None</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Looking back to look forward: Biology’s humble beginnings and rapid expansion</td>
<td>Select readings from Epic History</td>
<td>Deep dive: Identification and discussion of a selected Key Piece of work</td>
</tr>
<tr>
<td>3</td>
<td>What happened mid (last) century? How can we keep up??</td>
<td>Select readings from Epic History</td>
<td>Deep dive: Identification, agreement of, and discussion of a selected Key Piece of work</td>
</tr>
<tr>
<td>4</td>
<td>What were the main events that shaped historical biological understanding?</td>
<td>Select readings from The Biology Book</td>
<td>Deep dive: Discussion of a selected Key Piece of work</td>
</tr>
<tr>
<td>5</td>
<td>What were the main events that shaped our understanding of current biology?</td>
<td>Select readings from The Biology Book Or similar readings: (e.g. Foundations of Ecology)</td>
<td>Deep dive: What prominent works were key to today’s understandings? (In your specific field)</td>
</tr>
<tr>
<td>6</td>
<td>Transition to the present: How has your topic (from the Current Topics course) changed? Or Identify a Current Topic to track</td>
<td>Student information (topic) provided</td>
<td>Discovery: Can you put Your Topic in context with historical work we have identified? Written reflection</td>
</tr>
<tr>
<td>7</td>
<td>You can’t avoid the elephant in the room: The marriage (or divorce) of biology and belief</td>
<td>Select readings from Hacking Darwin</td>
<td>Discussion: A big, potentially ugly one. Be nice, folks.</td>
</tr>
<tr>
<td>8</td>
<td>The Ethics of Biology: When, where, and why to draw the line.</td>
<td>Select readings from Hacking Darwin</td>
<td>Discussion: Another big, potentially ugly one.</td>
</tr>
<tr>
<td>9</td>
<td>The Ethics of Biology: When, where, and why to draw the line. Or not? Let’s argue the OTHER side….</td>
<td>Select readings from Hacking Darwin</td>
<td>Discussion: Another big, potentially ugly one. Reflection assignment</td>
</tr>
<tr>
<td>10</td>
<td>Some levity, please Let’s shift and get another perspective</td>
<td>Select essays from Medusa and the Snail</td>
<td>A (simple) reflection: We need a break after the last couple of discussions. Amiright??</td>
</tr>
<tr>
<td>11</td>
<td>To the future…and beyond!</td>
<td>Provided by students</td>
<td>Discovery: Identification and presentation of Key Piece of work.</td>
</tr>
<tr>
<td>12</td>
<td>To the future…and beyond!</td>
<td>Provided by students</td>
<td>Discovery: Identification and presentation of Key Piece of work.</td>
</tr>
<tr>
<td>13</td>
<td>After Man Overview, salient points, and light-bulb moments</td>
<td>After Man</td>
<td>DUE – Summary paper/journal of required reading</td>
</tr>
<tr>
<td>14</td>
<td>The Future of Life Overview, salient points, and light-bulb moments</td>
<td>Future of Life</td>
<td>DUE – Summary paper/journal of required text</td>
</tr>
<tr>
<td>15</td>
<td>Course summary, evaluation</td>
<td>None</td>
<td>Discovery: Final discussion about</td>
</tr>
</tbody>
</table>
### Grading

<table>
<thead>
<tr>
<th>Category</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>8 @ 25 = 200</td>
</tr>
<tr>
<td>Discussion participation</td>
<td>15 @ 20 = 300</td>
</tr>
<tr>
<td>Summary papers</td>
<td>2 @ 100 = 200</td>
</tr>
<tr>
<td>Total possible points</td>
<td>700</td>
</tr>
</tbody>
</table>

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BSU Curriculum Forms

Form 3
Updated: 9.19.15

New Course Form

Course Number:
  Undergraduate:
  Graduate: **BIOL 6899**

Course Title: **Capstone**

Course Description:
**In this final course, students work closely with the professor of record and 2 additional BSU graduate faculty to design and implement a capstone project. Capstone projects involve scholarly and/or research-based pursuit of knowledge and content development. Though projects may vary based on individual interests, each will reflect a significant level of scholarship and creativity and build upon existing knowledge to create new learning experiences and an enhances level of expertise.**

Credits: **3 credits**

Prerequisite(s):
  Undergraduate:
  Graduate: **BIOL 6338 and BIOL 6890**

1. Reason(s) for creating this course: Culminating course for the proposed non-thesis/course-work only option for Biology MS

2. How often will this course be offered? Annually Spring

3. What are the student learning outcomes for the course (please precede each outcome with "Students will…")?
   - **Students will design and complete individual and/or group project involving scholarly and research-based study.**
   - **Students will review and evaluate existing knowledge of selected topic(s).**
   - **Students will generate innovative understandings of selected topic(s)**
   - **Students will create a tangible product/deliverable which enhances or adds to existing content.**

4. What are the major content areas for the course?
   Determined based on capstone project
5. Is this course repeatable for credit, and if so, what is the maximum number of credits that can be earned? **NO**

6. If this course is intended primarily for off-campus delivery (not offered on campus), what delivery mechanism will be used? **Off-campus, online, D2L**

7. What is the projected maximum class size (cap)? **30**

8. What qualified faculty will be available to teach this course? **All of the Biology graduate faculty will be qualified and available to teach this course on rotating basis.**

   **NOTE WELL:** Department and dean, in approving this proposal, attest both to the adequacy of the qualifications of faculty here named, and to their availability to teach the course at the frequency specified above, without excessive overload or disruption to other curriculum.

9. What additional library and other resources need or should be provided for this course, that are not already available? **None.**

10. What special personal property or service fee(s) would be charged to students taking this course? These charges would be for 1) items that are retained by the student and have an educational or personal value beyond the classroom, or 2) services that are on the student’s behalf (see MnSCU Board Policy 5.11). **None.**

   Amount per student: $

   For:

11. Attach a sample syllabus for the course. Note: if this course is double-numbered (u-grad/grad), the syllabus must include an additional component for graduate students.
Capstone: BIOL 6899  
Spring 2022  
3 credits

On-line course offered through Bemidji State University’s Department of Biology and Center for Extended Learning

Professor: Dr. R.W. Koch  
Office: Sattgast 214  
Email: rkoch@bemidjistate.edu  
Phone: (218) 755-2795  
Office Hours: To be arranged.

Course description:
In this final course, students work closely with the professor of record and 2 additional professionals to design and implement a capstone project. Capstone projects involve scholarly and/or research-based pursuit of knowledge and content development. Though projects may vary based on individual interests, each will reflect a significant level of scholarship and creativity and build upon existing knowledge to create new learning experiences and enhances level of expertise.  
Prerequisites: BIOL 6338 and BIOL 6890. Students should register for this capstone course during the final semester of their program

Expectations from students:  
Completion of individual/groups assignments. Provide constrictive evaluation of peers when appropriate. Provide weekly progress updates to instructor.

Course objectives:
- Design and complete individual and/or group project involving scholarly and research-based study.
- Review and evaluate existing knowledge of selected topic(s).
- Generate innovative understandings of selected topic(s)
- Creation of a tangible product/deliverable which enhances or adds to existing content.

Grading:  
Grading for this course is dependent upon continued progress made throughout the semester.  
Class policy with regard to plagiarism conforms to the university policy on such matters. At a minimum, plagiarism will result in a failing grade for the course. In short, don’t take credit for work that is not your own.
### Mental Health and Counseling:

Students may experience mental health concerns or stressful events that may lead to diminished academic performance. The Student Center for Health & Counseling is available to assist you with concerns and can include stress relief services. They can be reached in Cedar Hall, First Floor. Phone: (218) 755-2053.

### Accessibility statement:

Upon request this document can be made available in alternate formats. Please contact Accessibility Services at 755-3883.
### Schedule for BIOL 6899: Capstone

<table>
<thead>
<tr>
<th>Week</th>
<th>Subjects</th>
<th>Item(s) due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Welcome. Become familiar with course classmates and instructor. Project expectations.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Potential topics</td>
<td>Outline of project</td>
</tr>
<tr>
<td>3</td>
<td>Proposals</td>
<td>Project Proposal</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Short video presentations and peer evaluations</td>
</tr>
<tr>
<td>5</td>
<td>Individual/group work</td>
<td>Update to instructor</td>
</tr>
<tr>
<td>6</td>
<td>Individual/group work</td>
<td>Update to instructor</td>
</tr>
<tr>
<td>7</td>
<td>Individual/group work</td>
<td>Update to instructor</td>
</tr>
<tr>
<td>8</td>
<td>Individual/group work</td>
<td>Update to instructor</td>
</tr>
<tr>
<td>9</td>
<td>Individual/group work</td>
<td>Update to instructor</td>
</tr>
<tr>
<td>10</td>
<td>Individual/group work</td>
<td>Update to instructor</td>
</tr>
<tr>
<td>11</td>
<td>Individual/group work</td>
<td>Draft of paper</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Full video presentations and peer evaluations</td>
</tr>
<tr>
<td>13</td>
<td>Committee provides feedback of paper</td>
<td>Full video presentations and peer evaluations</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Full video presentations and peer evaluations</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Final paper due</td>
</tr>
</tbody>
</table>
BSU Curriculum Forms

Form 5

Program Modification Form

Program to be modified: Biology, MS

List all proposed change(s):

1. Create 2 separate pathways for completion of the Biology MS degree.
   a. Pathway 1: Thesis option
   b. Pathway 2: Non-Thesis, course-work-only option

2. In the Pathway 1 (Thesis option): replacement of BIOL 6894 Advanced Graduate Project (3 credits) with BIOL 6337 Advanced Science Communication (3 credits)

Reason(s) for the change(s):
Better meet the needs of potential students by providing a non-research intensive, online, course-work only option for the Biology MS. Modification of the Thesis Option pathway to include Scientific Communication with better instruct students on subtleties of scientific writing and dissemination of research.

Note: In order to avoid hidden prerequisites, if a course is being dropped from this program (but not from the entire curriculum), please check for which remaining courses may include this dropped course as a prerequisite. Course prerequisites may be found in the online catalog (http://www.bemidjistate.edu/academics/catalog/). Remedies for hidden prerequisites may be found under Curriculum Forms at (http://www.bemidjistate.edu/faculty_staff/faculty_association/forms/).

Note: If a course from another department/program was either added to or dropped from this program, please notify the chair/coordinator of that course's department/program and indicate the following:
The course’s home department/program was notified of the addition or dropping of their course(s) on __________(date) by ___________________(mail, email, or phone).

Please check one of the items below:

_____ No comments were received from other programs or departments within one week of the notification.

_____ Comments were received within one week of the notification, and are attached.

Note: If this is a joint program, the signatures of both department chairs (and both deans, if different colleges) must be provided.
Alert: Attach a copy of the current program showing the marked changes. Please copy the current program from the online catalog (http://www.bemidji.edu/academics/catalog/) and paste it into Word. Then use either the Track Changes feature under Tools, or the underline and strikethrough Font feature under Format. (Please note that the Track Changes feature may be easily switched on and off by holding down the Ctrl+Shift+E keys.)
Biology, M.S. master

The Biology program recognizes that goals of students seeking an MS Biology degree vary. We offer 2 different pathways for students seeking an MS in Biology. Pathway 1 (thesis option) combines a strong course curriculum with guided, independent research. Students with career aspirations in research, including those considering to further their education in a doctorate program are encouraged to complete this thesis option. Pathway 2 (non-thesis option) offers a flexible path entirely through online/distance learning courses or blended with on-campus courses, and is intended for students pursuing non-research intensive careers.

**Pathway 1: Thesis Option**

Required Credits: 30 Required  
GPA: 3.0

I. REQUIRED CORE

• BIOL 6350 Computer Applications in Statistics (3 credits)  
• BIOL 6890 Grants and Contracts (2 credits)  
• BIOL 6338 Advanced Science Communication (3 credits)  
• BIOL 6894 Advanced Graduate Project (3 credits)  

Must be taken four times over four semesters for 4 credits:
• BIOL 6880 Seminar (1 credit)

II. REQUIRED ELECTIVES

Select, with consent of advisor, a minimum of 12 semester credits of graduate level course work in Biology or related field.

III. REQUIRED RESEARCH Thesis

Complete the following course for 6 credits.
• BIOL6990

**Pathway 2: Non-thesis Option; course work only**

Required Credits: 36  
GPA: 3.0

I. REQUIRED CORE

• BIOL 6330 Current Topics in Biology (3 credits)  
• BIOL 6338 Advanced Science Communication (3 credits)  
• BIOL 6340 Controversies in Biology (3 credits)  
• BIOL 6350 Computer Application in Statistics (3 credits)  
• BIOL 6450 Trajectories in Biology: Past, Present and Future (3 credits)  
• BIOL 6890 Grants and Contracts (2 credits)
II. REQUIRED ELECTIVES
Select, with consent of advisor, a minimum of 16 semester credits of graduate level course work in Biology or related field.

III. Required Capstone (Note: Completed in student’s final semester)
- BIOL 6899 Capstone (3 credits)

Competency Requirement
Statistics: A working knowledge of applied statistics. This requirement may be satisfied by successfully completing BIOL 6350 Computer Applications in Statistics (3 credits)
Clean Copy of Program

Biology, M.S. master

The Biology program recognizes that goals of students seeking an MS Biology degree vary. We offer 2 different pathways for students seeking an MS in Biology. Pathway 1 (thesis option) combines a strong course curriculum with guided, independent research. Students with career aspirations in research, including those considering to further their education in a doctorate program are encouraged to complete this thesis option. Pathway 2 (non-thesis option) offers a flexible path entirely through online/distance learning courses or blended with on-campus courses, and is intended for students pursuing non-research intensive careers.

Required Credits: 30 (thesis) or 36 (non-thesis)
GPA: 3.0

Pathway 1: Thesis Option (30 credits)
I. REQUIRED CORE
   • BIOL 6350 Computer Applications in Statistics (3 credits)
   • BIOL 6890 Grants and Contracts (2 credits)
   • BIOL 6338 Advanced Science Communication (3 credits)

   Must be taken four times over four semesters for 4 credits:
   • BIOL 6880 Seminar (1 credit)

II. REQUIRED ELECTIVES
Select, with consent of advisor, a minimum of 12 semester credits of graduate level course work in Biology or related field.

III. REQUIRED Research Thesis
Complete the following course for 6 credits.
   • BIOL 6990 Thesis

Competency Requirement
Statistics: A working knowledge of applied statistics. This requirement may be satisfied by successfully completing BIOL 6350 Computer Applications in Statistics (3 credits)

Pathway 2: Non-thesis Option; course work only (36 credits)
I. REQUIRED CORE
   • BIOL 6330 Current Topics in Biology (3 credits)
   • BIOL 6338 Advanced Science Communication (3 credits)
   • BIOL 6340 Controversies in Biology (3 credits)
   • BIOL 6350 Computer Application in Statistics (3 credits)
   • BIOL 6450 Trajectories in Biology: Past, Present and Future (3 credits)
   • BIOL 6890 Grants and Contracts (2 credits)
II. REQUIRED ELECTIVES
Select, with consent of advisor, a minimum of 16 semester credits of graduate level course work in Biology or related field.

III. Required Capstone (Note: Completed in student’s final semester)
- BIOL 6899 Capstone (3 credits)

Competency Requirement
Statistics: A working knowledge of applied statistics. This requirement may be satisfied by successfully completing BIOL 6350 Computer Applications in Statistics (3 credits)
BSU Curriculum Forms
Form 8
Updated: 09.18.15

Signatures

Richard Koch / Professor of Biology / 10.20.2019

Mark Wallert / Biology / 10.21.2019

Chair or Director / Department or Program / Date
Note: "All departmental recommendations [on curriculum] must be reviewed and approved by the department's faculty."--IFO/MnSCU Master Agreement 2009-2011, 20.A.3 (p. 80).

At this point, packet goes to Records Office/Curriculum Coordinator to be logged in to the Curriculum Proposal Progress Grid.

Marilyn Yoder / Business, Mathematics and Sciences / 10.25.2019

Dean / College / Date

Note: If proposal is sent back to the Proposer, please notify the Curriculum Coordinator. If approved, packet goes to Academic Affairs Office.